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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/001,557 | 10/24/2001 | Bohumil Lojek | ATM-204 | 6412 |

3897 7590 10/03/2003

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SAN JOSE, CA 95109-0005

EXAMINER

SOWARD, IDA M

ART UNIT PAPER NUMBER

2822

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/001,557

Applicant(s)

LOJEK ET AL.

Examiner

Ida M Soward

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1 and 6-8 is/are rejected.
- 7) ☒ Claim(s) 3-5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

This Office Action is in response to the Applicants' remarks filed August 25, 2003.

Specification

The abstract of the disclosure is objected to because "**comprising**" should have been **including** in line 4. Correction is required. See MPEP § 608.01(b).

Claim Objections

Claims 3-5 are objected to because of the following informalities: claim 3 depends on cancelled claim 2 and claim 4 depends on claim 3 which depends on cancelled claim 2 and so on. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (6,160,287) in view of Manley et al. (5,108,939).

Chang teaches a memory cell comprising: a semiconductor substrate 50, with a drain 72 and a source 78 in the substrate; a floating gate 62 formed on the substrate, the floating gate including a main floating gate region and a small sidewall spacer electrically coupled together by a connecting layer 80, the connecting layer being formed over and in contact with both the small sidewall spacer and the main floating gate region; a first insulating layer 52 separating the floating gate from the substrate; a control gate 60 formed over the floating gate; and a second insulating layer 64 separating the control gate and the floating gate (Figure 12, cols. 3-5, lines 26-67, 1-67 and 1-14, respectively). However, Chang fails to teach a first insulating layer including a first insulating portion separating a small sidewall spacer from a substrate and a second insulating portion separating a main floating gate region from the substrate, wherein the first insulating portion is thinner than the second insulating portion. Manley et al. teach a non-volatile memory cell comprising: a first insulating layer including a first insulating portion 511 separating a small sidewall spacer 515 from a substrate 501 and a second insulating portion 503 separating a main floating gate region 504 from the substrate, wherein the first insulating portion is thinner than the second insulating portion (Figure 5M, cols. 6-8, lines 37-68, 1-68 and 1-21, respectively). Manley et al. further teach the first insulating portion over a drain 507. Since Chang and Manley et al. are from the same field of endeavor (memory structures), the purpose disclosed by Manley et al. would have been recognized in the pertinent art of Chang. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the memory structure of Chang by incorporating the first and

second insulating portions of Manley et al. to provide a small cell size and high coupling ratio (col. 1, lines 8-12).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (6,160,287) and Manley et al. (5,108,939) as applied to claims 1 and 7 above, and further in view of Wang (US 6,207,507 B1).

Chang and Manley et al. teach all mentioned in the rejection above. However, Chang and Manley et al. fail to teach a small sidewall spacer residing along a side and on top of a main floating gate region. Wang teach a small sidewall spacer 111 residing along a side and on top of a main floating gate region 125 (Figure 7, cols. 2-3, lines 10-67 and 1-54, respectively).). Since Chang, Manley et al. and Wang are from the same field of endeavor (memory structures), the purpose disclosed by Wang would have been recognized in the pertinent art of Chang and Manley et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the memory structure of Chang and the first and second insulating portions of Manley et al. by incorporating the small sidewall spacer of Wang to suppress the punch through phenomena (col. 2, lines 16-30).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (6,160,287) and Manley et al. (5,108,939) as applied to claims 1 and 7 above, and further in view of Shone et al. (5,618,742).

Chang and Manley et al. teach all mentioned in the rejection above. However, Chang and Manley et al. fail to teach source & drain self-aligned with the opposing sides of the main floating gate region. Shone et al. teach source 215 & drain 214 self-aligned with the opposing sides of the main floating gate region 232 (Figure 5G, cols. 11-12, lines 18-67 and 1-62, respectively). Since Chang, Manley et al. and Shone et al. are from the same field of endeavor (memory structures), the purpose disclosed by Shone et al. would have been recognized in the pertinent art of Chang and Manley et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the memory structure of Chang and the first and second insulating portions of Manley et al. by incorporating the self-aligned source and drain region of Shone et al. to obtain an easily scalable design (abstract).

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

It is acknowledged that claim 2 has been cancelled.

Response to Arguments

Applicant's arguments with respect to claims 1 and 3-8 have been considered but are moot in view of the new rejection and newly applied references.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respects to non-volatile memory devices:

Lambertson (5,544,103)

Wada et al. (5,087,584).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M Soward whose telephone number is 703-305-3308. The examiner can normally be reached on Monday - Thursday, 6:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ims
September 11, 2003


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800